

## ABSTRACT

An iterative multistage detection system and method for orthogonally multiplexing  $K$  channels onto a signal processing chain using  $N$  orthogonal sequences of length

5     $N$ . The  $K$  channels include a first set of  $N$  channels and a second set of  $M$  channels (the  $M$  channels being separate and distinct from the  $N$  channels), where  $K = N + M$ . In a first iteration, interference from the first set of  $N$  channels imparted on the second set of  $M$  channels is removed from the multiplexed signal, thereby enabling the symbol values associated with the second set of  $M$  channels to be reliably estimated. In a second iteration, interference from the second set of  
10     $M$  channels imparted on the first set of  $N$  channels is removed from the first set of  $N$  channels, thereby enabling the symbol values associated with the first set of  $N$  channels to be reliably estimated.

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